

REMARKS

Applicants will address each of the objections and rejections in the order in which they appear in the Office Action.

Claim Objections

In the Office Action, the Examiner objects to Claim 16 for an informality therein. Accordingly, Applicants are amending Claim 16 as suggested by the Examiner. Therefore, it is respectfully requested that this objection be withdrawn.

Claim Rejections - 35 USC §103

Claims 15-47.

In the Office Action, the Examiner now rejects Claims 15-47 under 35 USC §103(a) as being unpatentable over Matsumoto et al. (US 2005/0098207) in view of Forrest et al. (US 5,703,436). This rejection is respectfully traversed.

Initially, Applicants note, as Applicants explained in their prior response to this rejection, that independent Claims 15, 16 and 32 include the feature of “wherein the transparent conductive film comprises at least one material selected from the group consisting of indium tin oxide, indium tin oxide containing silicon, and indium oxide containing zinc oxide by 2 to 20%.” In the rejection, the Examiner continues to contend that “it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the light emitting device as taught by Matsumoto et al. with using ITO for the transparent conductive film as taught by Forrest et al.” Applicants respectfully disagreed.

As Applicant previously explained, in Forrest, ITO layers 26I are merely used as part of the electrodes (i.e. ITO/metal layers 26) of each LED. In contrast, layer 76 of V₂O₅:CuPc or layer 77 of CuPc in Matsumoto (which the Examiner alleges corresponds to the claimed third layer) are not electrodes. In particular, copper phthalocyanine (CuPc) is a pigment (see e.g. paragraphs [0135] - [0136] in Matsumoto). Hence, layer 76 of V₂O₅:CuPc or layer 77 of CuPc of Matsumoto and the ITO layer 26I of Forrest are completely different types of layers. Therefore, there is no reason to replace layer 76 of V₂O₅:CuPc or layer 77 of CuPc of Matsumoto with the ITO layer 26I of Forrest. Since there is no reason to make this substitution, the combination of references to reject the claimed invention is improper.

In the “Response to Arguments” section in the pending Office Action, the Examiner argues that “layer 76 in Matsumoto is composed of V₂O₅:CuPc and layer 77 in Matsumoto is composed of CuPc and both of these materials are conductive” (emphasis added). Applicants respectfully disagree.

Initially, it is noted that CuPc is not a conductive material but an insulator. In support thereof, Applicants are submitting herewith (in the enclosed IDS) Tang, “Two-layer organic photovoltaic cell.” Tang teaches that *the room-temperature resistivity of CuPc, thin film or single crystal, is $\sim 10^{10} \Omega \text{ cm}$* (see lines 18-19 of the right-hand column on page 184 in Tang). Hence, the conductivity of CuPc is approximately 10^{-10} S/cm , and CuPc is regarded as an organic insulator (see lines 20-21 of the right-hand column on page 184 in Tang).

While conductivity may be raised by several orders of magnitude by doping, the conductivity would not reach such a level that CuPc with dopant is conductive. See e.g. Pfeiffer et al., “OLEDs with Doped Transport Layers for Highly Efficient Displays” (which Applicants are submitting herewith in the enclosed IDS). In Pfeiffer, Figure 1 shows the conductivity of ZnPc doped with the

strong electron acceptor F4-TCNQ as a function of the molecular doping ratio. Pfeiffer states that “it is obvious that the conductivity can be controlled over more than two orders of magnitude by the doping ratio; furthermore, the conductivity is many orders of magnitude higher than the background conductivity of nominally undoped ZnPc (10^{-10} S/cm in vacuo”). See lines 1-7 of left-hand column on page 1077 in Pfeiffer. As is clear from Pfeiffer, the conductivity of metal phtalocyanine can be controlled to some extent by the doping. However, it is not as high as that of conductors because the metal phtalocyanine itself is an insulator. Hence, one skilled in the art would not consider that a layer composed of CuPc and a layer composed of CuPc: V₂O₅ are conductive. For at least the foregoing reasons, it is not proper to modify the light emitting device as taught by Matsumoto with using ITO for the transparent conductive film as taught by Forrest, as contended in the rejection.

Accordingly, this rejection is not proper and should be withdrawn.

Claim 48

The Examiner also rejects Claim 48 under 35 USC §103(a) as being unpatentable over Matsumoto in view of Forrest and further in view of Igarashi (US 2002/0134984). This rejection is also respectfully traversed.

Each of these claims is a dependent claim. Therefore, for at least the reasons discussed above for the independent claims, each of these claims is also patentable over the cited references. Accordingly, it is respectfully requested that this rejection be withdrawn.

New Claim

Applicants are also adding new dependent Claim 49. This claim is supported by, for example, at least Fig. 1 of the present application.

As this is a dependent claim, it is allowable for at least the reasons discussed above for the independent claims. Further, the cited references do not appear to disclose or suggest this claim.

Accordingly, it is respectfully requested that this new claim be entered and allowed.

If any fee should be due for this new claim, please charge our deposit account 23/0920.

Information Disclosure Statement

Applicants filed an information disclosure statement (IDS) on September 3, 2010 and are filing an IDS herewith. It is respectfully requested that these IDSs be entered and considered prior to the issuance of any further action on this application.

Conclusion

It is respectfully submitted that the present application is in a condition for allowance and should be allowed.

If any fee should be due for this amendment and/or the new claim, please charge our deposit account 23-0920.

Favorable reconsideration is earnestly solicited.

Date: November 16, 2010

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